

Comments on CIA/SI 57-58, A Technical Evaluation of the
Soviet Nuclear Power Program, 15 May 58, S.

1. The preface of this report, prepared under CIA/OSI external research contract by the [REDACTED] out-
lines the objectives as follows:

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"The objectives of the report are to estimate the technical feasibility of the Soviet nuclear power program as outlined in the Sixth Five-Year Plan (1956-60) and the probable course of this program in the years 1961-70. A secondary objective of the project is to estimate the effect of the Soviet nuclear power program on their stockpile of fissionable materials."

It is further stated that:

"The estimates presented herein are not contrary to the immediate views of the Office of Scientific Intelligence."

2. Our comments apply only to what appear to be erroneous estimates presented in the report concerning the total installed electric generating capacity of the USSR. Since these estimates were instrumental in deriving estimates of the probable course of the Soviet nuclear power program in the years 1961-1970, one of the main objectives of the report, corrections of this data may affect the conclusions of the report or at least "set the record straight." The report states:

p. 7 "According to the reply of the USSR to the UN Questionnaire, (S-1-8) there will be a total of about 28,300 MW electrical generating capacity in 1960. The nuclear power program will therefore constitute about 3.5% of the total Russian generating capacity."

On page 12, however, 28,300 MW is used as the capacity for 1957, and 43,000 MW for 1960. Moreover, in getting the 3.5%, the author divides what is apparently a nuclear power estimate of 990 MW by 28,300 MW

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representing total capacity -- but the 990 MW estimate has not been explicitly made up to this point and is never made anywhere in the paper. 1,475 MW is given as the apparent plan for 1960 in Table I, page 7, 715 MW is given in Table III, page 15, as the estimate of average capacity during 1960 and Figure I shows a maximum of 900 MW and a minimum of 600 MW for 1960.

According to the original Sixth Five-Year Plan, total electric generating capacity at the end of 1960 is planned to be 2.2 times that at the end of 1955. Since the Soviets had 37,200 MW installed at the end of 1955, this would mean that 81,800 MW were planned for the end of 1960. There are indications, however, that this goal will not be fulfilled. Currently, we are estimating that only about 65,000 MW will be installed by that time. This is more than double the 28,300 MW figure applied to 1960 and 50% greater than the 43,000 MW figure applied to 1960 on page 12. The figure of 990 MW works out to be about 1.5% of our estimate of Soviet electric generating capacity at the end of 1960 (65,000 MW), or 1.2% of the original Soviet goal (81,800 MW).

3. The report states:

p. 12 "If the published expected total power production in the USSR (a-1-8) for the years 1957 (211 x 109 kwh or 28,300 MW capacity) and 1960 (320 x 109 kwh or 43,000 MW capacity) are projected to the year 1970 (Figure 1) the anticipated total power capacity in Russia would be about 140,000 MW."

The above production figures are reasonably correct, but the capacity figures are considerably lower than we would estimate. In addition, the production figures were divided by an average annual hours of operation of about 7,500 hours to derive the capacity estimates of 28,300 MW and 43,000 MW. The Soviets, it is true, have claimed that nuclear power plants will operate 7,500 hours per year as base

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load plants, but this figure is unrealistic as an average for the USSR. The average in 1955 was 4,955 hours, decreasing somewhat in 1956 and 1957.

4. In Figure 1, the estimate of 140,000 MW in 1970 was derived by projecting the annual rate of growth of increase of capacity from 1957 to 1960. Based on the erroneous figures of 28,300 MW and 43,000 MW such a simple projection would give 180,000 MW in 1970 instead of the 140,000 MW as shown in the graph and as stated on pages 12 and 13.

If the correct figure for 1957 were used (47,800 MW) in conjunction with the planned capacity figure corresponding to the planned 1960 production of 320 billion kWh (81,800 MW), then a projection of this rate of growth would give the absurd figure of 480,000 MW in 1970.

Our current estimate of total electric generating capacity at the end of 1970 is about 160,000 MW, which assumes a reduction in the rate of growth. Thus, the 3 errors in the report were compensating so that the 1970 figure derived from faulty methodology and faulty data happens to be near our current estimate. (Errors in 1) estimating 1957 and 1960 capacity, 2) methodology of projecting annual growth through 1970, and 3) apparent mechanical error in projection.

p. 13 "Assuming that by 1970 the nuclear power capacity will quite likely have reached 5-10% of the total power generating capacity (estimated USA value is 6.3%; UK is about 33%), then an installed nuclear capacity of 7,000 to 14,000 MW may be expected."

Evidently the estimates of the Soviet nuclear power program through 1970 are based upon an arbitrarily assumed relation of nuclear power plant capacity to total electric generating capacity in 1970. Through a series of compensating errors the figure of 140,000 MW electric generating capacity in 1970 is within reason. However, if our estimate of 160,000 MW is used,

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the nuclear capacity in 1970 derived from the above 5-10% would be 8,000 to 16,000 MW.

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